CLAIMS

1. A plug for thermoforming operations composed of a syntactic foam comprising:
a thermoplastic resin having a melting point and/or Tg at least 5°C higher than the design operating temperature of said thermoforming operation, and
a hollow filler having a lower density than said resin.

2. The plug according to claim 1, wherein said thermoplastic resin has a melting point and/or Tg of greater than 180°C.

3. The plug according to claim 1, wherein said thermoplastic resin has a melting point/and or Tg of greater than 200°C.

4. The plug according to claim 1, wherein said thermoplastic resin comprises a polyamide, polycarbonate, polyurethane, polyester, polyacrylate, and/or copolymers and/or mixtures thereof.

5. The plug according to claim 4, wherein said thermoplastic resin comprises a polyamide formed from a lactam monomer having at least 6 carbon atoms.

6. The plug according to claim 5, wherein said thermoplastic resin comprises nylon 6, nylon 6.6 or mixtures thereof.

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7. The plug according to claim 1, wherein said syntactic foam comprise less than 70 vol.% of said hollow filler.

8. The plug according to claim 1, wherein said hollow filler includes glass microspheres, hollow polymeric microspheres, hollow ceramic microspheres, microspheres of urea-formaldehyde resin and/or phenol-formaldehyde resin.

9. A process for forming the plug according to claim 1, wherein said plug is formed *in-situ* from a mixture comprising said filler and a monomer which is polymerized in a mold that at least approximates the shape of the desired plug.

10. The process according to claim 9, wherein a lactam monomer is polymerized to polyamide.

11. The process according to claim 10, wherein said *in-situ* polymerization to polyamide is assisted with an alkali earth metal and/or alkaline earth metal catalyst.

12. The process according to claim 11, wherein said *in-situ* polymerization is assisted by an organic isocyanate, ketene, acid chloride, acid anhydride, or N-substituted imide polymerization promoter.

ADDENDUM

13. A process of thermoforming at least one article using the plug according to claims 1 or the plug prepared by the process of claims 9.

14. An article formed by the process of claim 13.

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